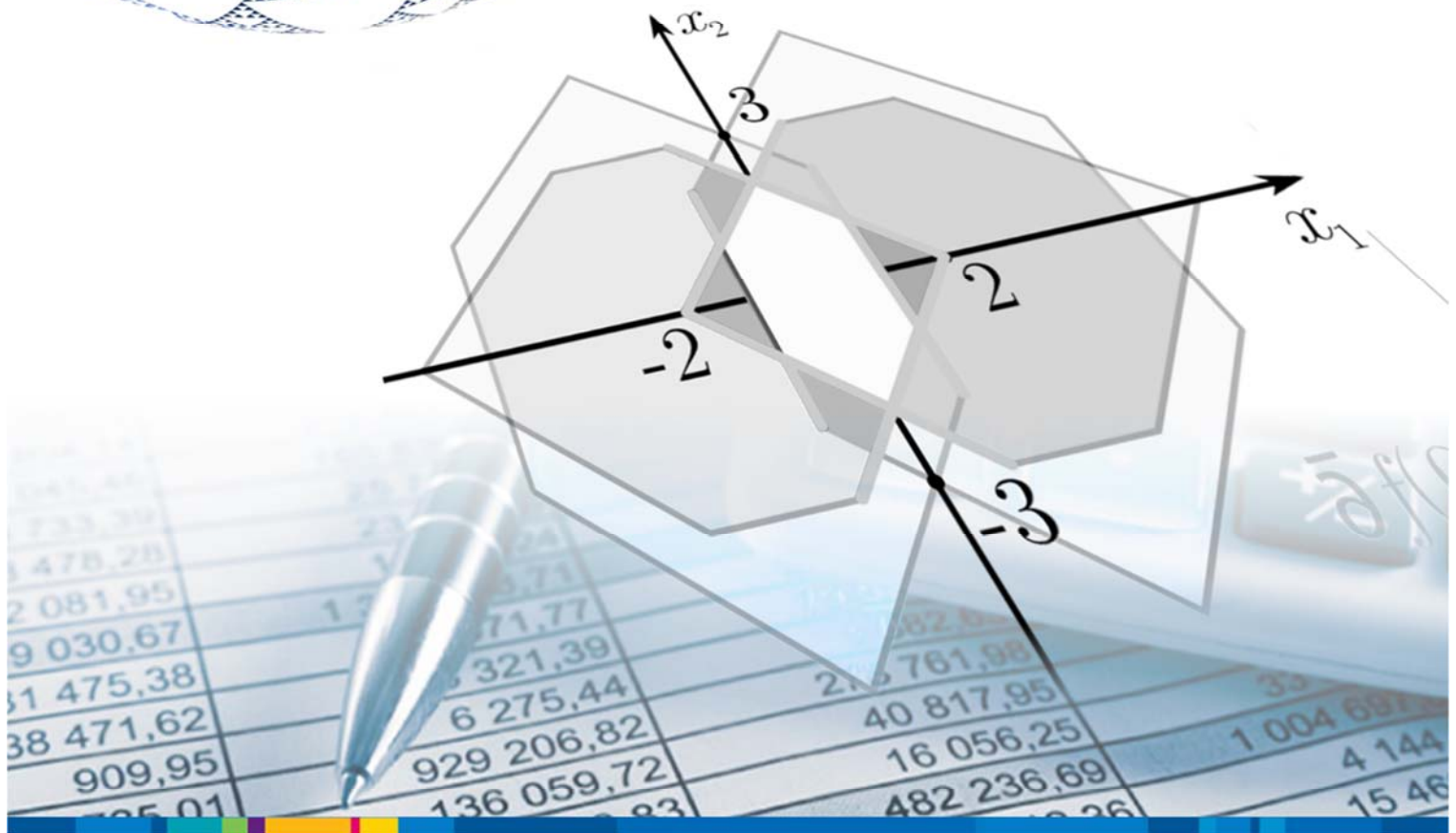


CIAO Newsletter

Centre for Informatics and
Applied Optimization

Edition #40: Apr-Jun 2019



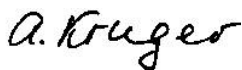
Director's section

Welcome to our second Newsletter of 2019. It covers the period April to June.

Unfortunately all CIAO achievements during this period were overshadowed by passing away of Dr David Stratton. David's strong will, his commitment to research and contagious enthusiasm, his friendly smile and willingness to help have contributed to many people within the then School of Information Technology and Mathematical Science becoming researchers. David was the first to obtain professional doctor degree from the then University of Ballarat. Together with his friend Dr Phil Smith, David founded and for many years actively led the Virtual Reality and Simulation Laboratory within CIAO involved in several important multimillion dollar projects. Dr David Stratton will be remembered.

Consultations are still under way concerning the structure of management of research at the university including the funding arrangements for the newly determined Research Priority Areas. We are hoping to have more clarity on this issue by the end of the year.

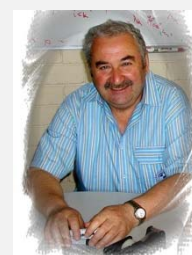
All available previous issues starting from 2003 as well as the series of the *School of Information Technology & Mathematical Sciences* Research Newsletters dating from 1998 can be accessed from the CIAO web site: <http://federation.edu.au/ciao>.



Prof Alex Kruger

In this issue:

- Grants, awards and recognition
- Past and forthcoming events
- Staff news
- HDR news
- Vale David Stratton
- CIAO in history
- New publications



Prof Alex Rubinov
CIAO Founding
Director



Prof Alex Kruger
CIAO Research
Director



A/Prof David Yost
Editor of CIAO
Newsletter

Grants, awards and recognition

FedUni researcher awarded major CSIRO grant

CIAO researcher **Dr Savin Chand** received a major competitive grant of \$120,000 to continue research into climate extremes.

The grant is through the CSIRO and the Australian Bureau of Meteorology's National Environment Science Program (NESP) funded by the Department of Environment and Energy, and is a further extension of Dr Chand's initial funding of \$183,211 that was awarded in mid-2017 through the same scheme. The new grant will continue the work over the 2019 -2020 period.

The National Environmental Science Program (NESP) is a long-term commitment by the Australian Government to deliver collaborative, practical and applied research to inform decision making and on-ground action on climate change adaptation.

"Currently there are lots of uncertainties in climate model projections on how tropical cyclone intensities will change in the future due to human-induced global warming," said Dr Chand.

"This work will help develop new methods of addressing those uncertainties to make more reliable projections of tropical cyclone activity across different regions in Australia and elsewhere."

Dr Chand was also one of three scientists featured in an ABC interview "how might climate change affect cyclones?" Climate scientists from around the world converged at a major meteorological and oceanography conference in Darwin from 11–14 June, organised as part of the Australian Meteorological and Oceanographic Society Annual Meeting and the International Conference on Tropical Meteorology and Oceanography. Dr Chand presented his latest research on how human-induced climate change is impacting the frequency and intensity of tropical cyclones in Australia, and around the world. He was later interviewed by the ABC on his ground-breaking work. The recorded interview remains available at

<https://www.abc.net.au/radio/programs/pm/how-might-climate-change-affect-cyclones/11211520>.

Keynote invitation

Prof David Yost was a keynote speaker at the conference *Banach Spaces and their Applications*, held in Lviv, Ukraine, 26-29 June 2019. This International conference had over 100 participants from all continents and was dedicated to the 70th birthday of David's co-author Anatolij M.Plichko.

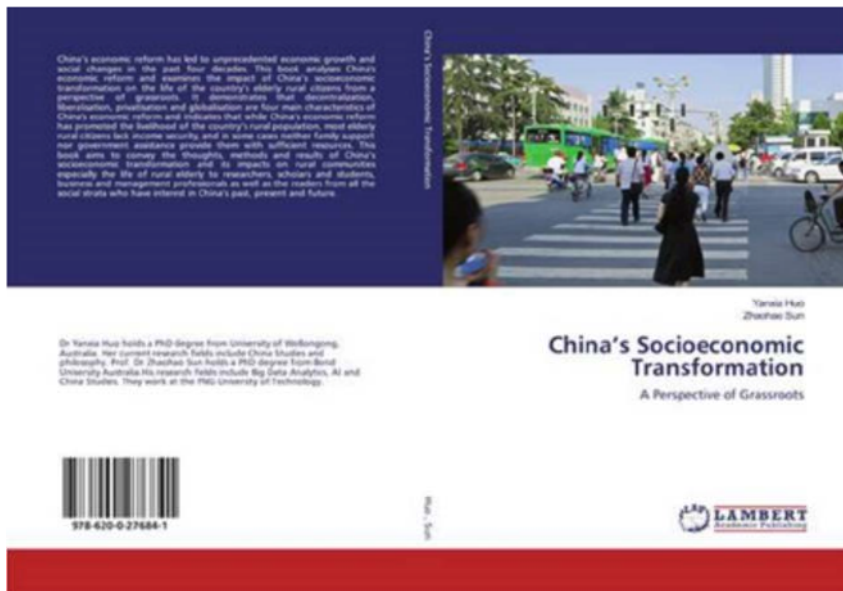
Hoa Bui visits Germany

PhD student Hoa Bui was awarded a travel grant of 2000 EURO for a scientific visit to the Martin Luther University, in Germany. She visited Prof Christiane Tammer at the Halle campus for one month in June. While in Germany, Hoa also visited Prof Russell Luke at the University of Gottingen.



Book published

Congratulations to CIAO Honorary Research Fellow Zhaohao Sun (Department of Business Studies, PNG University of Technology) and his co-author Dr Yanzia Huo for their book *China's Socioeconomic Transformation – A Perspective of Grassroots*, published by Lambert Publishing.



China's economic reform has led to unprecedented economic growth and social changes in the past four decades. This book analyses China's economic reform and examines the impact of China's socioeconomic transformation on the life of the country's elderly rural citizens from a grassroots perspective. It demonstrates that decentralization, liberalisation, privatisation and globalisation are four main characteristics of China's economic reform and indicates that while China's economic reform has promoted

the livelihood of the country's rural population, most elderly rural citizens lack income security, and in some cases neither family support nor government assistance provide them with sufficient resources. This book conveys the thoughts, methods and results of China's socioeconomic transformation and its impacts on rural communities, especially the life of rural elderly. It is aimed to readers from all social strata who have interest in China's past, present and future, including researchers, business and management professionals.

The book is available from <https://www.morebooks.shop> and will soon also be available on Amazon.com.

Events

STEMinist dinner

FedUni STEMInists, **Dr Taiwo Oseni** and **Dr Samudra Jayasakera** joined twenty western Victorian women at our TAFE hospitality training restaurant Prospects, on 30th June to share dinner, celebrate their enthusiasm for physics, IT and engineering and continue work on a project to inspire school girls to follow in their footsteps.

The STEMInist Dinner was jointly coordinated by FedUni's School of Science, Engineering and Information Technology and the VicPhysics Teachers' Network and was attended by engineers from FedUni and other regional organisations which provide research and manufacturing services in industries as diverse as transport, insurance, telecommunications, teaching, food processing, mining and mechanical systems. Ballarat companies Mars Wrigley Confectionery, Gekko Systems, Maxitrans, VicRoads and Rabobank were represented along with women from Bendigo, Geelong and Warrnambool and physics teachers from several local schools.

Dan O'Keeffe from VicPhysics said: Following our successful partnership with Federation University to bring Girls in Physics Breakfasts and Women in Physics Lectures to life in Ballarat

over the last few years, we are delighted to work with FedUni again to gather regional Victorian women who work in STEM to contribute to the next phase of our project which aims to inspire young people, and girls in particular, into STEM careers.

Guests developed a brief profile about themselves, their education, career path and current role to be shared with school students.



Federation University's Prof Syed Islam, Dean School of Science, Engineering and Information Technology said: FedUni is keen to encourage young people from a diverse range of backgrounds into STEM careers – girls in particular often don't envisage themselves in a STEM career and believe that they won't fit in. Our aim is to paint a very different picture – that there are in fact women working in rewarding and interesting STEM careers who are just like them. The profiles our STEMInists create this evening are an important step in reaching that goal.

Collaboration with CeRDI

On 11th June, several CIAO researchers met with staff from Fed Uni's Centre for eResearch and Digital Innovation (CeRDI) to discuss possible opportunities for extending our existing collaboration. CeRDI focus on enabling open, online access to large spatial data sets in a variety of areas including agriculture and environmental management, and have strong ongoing relationships with numerous government, industry and community bodies responsible for that data. CIAO's expertise in optimization, data analytics and machine learning could potentially be applied to extract additional value from these datasets, and CIAO and CeRDI will be continuing discussions to identify specific funded projects where such collaboration could occur.

CIAO seminars

Optimisation

Date	Name	Affiliation	Topic	
30 May	Dr Janosch Rieger	Monash University	An approach to electrical impedance tomography in unknown domains	
2 May	Mr Nguyễn Duy Cường	CIAO, Federation University Australia	First-order and second-order sufficient conditions for nonlinear error bounds	



Prof Sid Morris's Seminar, 13 June 2019



Mr Nguyen D. Cuong, 2 May 2019

Research forums

Date	Name	Affiliation	Topic
13 Jun	Emeritus Professor Sidney Morris	Federation University, La Trobe University	Research: yesterday, today, tomorrow

CIAO Visitors

Dates	Name	Institution
18-31 Mar	Dr Napsu Karmitsa	University of Turku, Finland
5-19 Mar	Prof Ramiz Aliguliyev	Institute of Information Technology, Azerbaijan National Academy of Sciences

Forthcoming events

Optimization methods in wildfire emergency management

This Workshop for early career researchers will take place on *November 11, 2019* at RMIT University in Melbourne. The topics are: Optimisation, Operations Research and Mathematical Models for emergency management

Registration and further info: <http://geosafe.lessonsonfire.eu/2019/07/09/workshop-optimization-methods-in-wildfire-emergency-management/>

China-Australia Workshop on Applied Optimisation

The Ninth China-Australia Workshop on Optimization: Theory, Methods and Applications (CAWO 2019), will be held in Shanghai University, Shanghai, China from 16 to 18 November 2019.

It is being organized by China-Australia Collaboration in Applied Optimization (CACAO), which includes Shanghai University; Chongqing Normal University; Federation University Australia and

Curtin University. Once again, CAWO 2019 aims to bring researchers and practitioners around the world on optimization and optimal control together to exchange ideas and approaches, to present research findings and state-of-the-art solutions, to share experience and future research development on theory, methods and applications for optimization and optimal control. The previous CAWOs were held in Shanghai (2003, 2007, 2011), Ballarat (2004, 2009, 2013), Chongqing (2015) and Perth (2017).

Registration and further info: <http://www.smartchair.org/hp/CAWO9>

AustMS 2019

The 63rd Annual Meeting of the Australian Mathematical Society will be held from Tuesday 3–Friday 6 December 2019, at Monash University’s main campus at Clayton. There will be a wide variety of special sessions, including Applied and Industrial Mathematics, Computational Mathematics, and Optimisation.

Registration and further info:

https://register.austms.org.au/sys/registration/identity.php?conf_id=44

WoMBaT 2019

The Centre for Informatics and Applied Optimisation would like to advise that the fourth Workshop on Metric Bounds and Transversality (WoMBaT2019) will be held on 8–10 December 2019 at Swinburne University of Technology in Melbourne, organised by CIAO members Dr Nadia Sukhorukova (Swinburne University of Technology), Prof. Andrew Eberhard, (RMIT University), Prof. Alex Kruger, Dr Vera Roshchina (UNSW), Dr Julien Ugon (Deakin University).

Prof Alex Kruger, Organising Committee Member, said "the workshop provides an opportunity to bring together key mathematicians from across the world for discussions on the latest research in the area of Metric Bounds and Transversality"

Registration and further info: <https://www.wombat.rmitopt.org/>

Confirmed international participants:

- Prof. Fusheng Bai (Chongqing Normal University)
- Prof. Ewa Bednarczuk (Systems Research Institute, Polish Academy of Sciences)
- Prof. Jean-Pierre Crouzeix (University Clermont-Auvergne and Federation University Australia)
- Prof. Asen Dontchev (Mathematical Reviews and The University of Michigan)
- Prof. Alexander Ioffe (Technion)
- Dr Scott Lindstrom (Hong Kong Polytechnic University)
- Prof. Marco López (University of Alicante and Federation University Australia)
- A/Prof. Héctor Ramírez (University of Chile)
- Dr Nir Sharon (Tel Aviv University)
- Prof. Michel Théra (University of Limoges and Federation University Australia)
- Prof. Hong-Kun Xu (Hangzhou Dianzi University)

ICME15 to be held in Australia

Given the importance of a mathematically educated workforce, CIAO welcomes the announcement that the 15th International Congress on Mathematics Education (ICME15) will be held in 2024 at the International Conference Centre in Sydney. Kim Beswick, Head of the School of Education at

UNSW, is the proposed convener, with Will Morony of AAMT as Chair of the Organizing Committee. This decision was announced recently by the International Committee for Mathematics Instruction (ICMI), which inaugurates this event every four years. It is the largest international conference on mathematics education with well over 2,000 mathematics educators, mathematicians, researchers, teachers and resource producers expected to participate over an eight day period. It was last held in Australia in 1984, in Adelaide. The most recent previous ICMEs were held in Shanghai, Hamburg, Seoul and Monterrey.

The decision by ICMI is a tribute to the efforts of the consortium organising the bid, under the auspices of the Australian Academy of Sciences led by the Australian Association of Mathematics Teachers (AAMT) and including the Australian Mathematical Society (AustMS), Australian Council of Heads Mathematical Sciences, Australian Mathematical Sciences Institute, Aboriginal and Torres Strait Islander Mathematics Alliance, Mathematical Association of NSW, Mathematics Education Research Group of Australasia, and Statistical Society Australia. The bid was facilitated by Business Events Sydney, together with the NSW Government and Tourism Australia.

The delegation from ICMI met with Presidents or nominees from all of the societies and institutes listed above as well as the Chief Scientist, Alan Finkel; the CEO of the Australian Mathematics Trust, Nathan Ford; the Director of the NSW State office of the Department of Foreign Affairs, Trudy Witbreuk; the Director of Curriculum of the NSW Education Standards Authority, Lyndall Foster; the Secretary of the Australian Department of Education and Training, Michele Bruniges; the Executive Director of the Australian Council of Deans of Science, John Rice; the President and Vice-Chancellor of UNSW, Ian Jacobs; notable members of the mathematics education community including Judy Anderson, Mary Coupland, John Mack, Eddie Woo, and Cheryl Praeger.

Alan Finkel said "At all level of government, it is well understood that a workforce skilled in mathematics is critical to our future. Hosting events such as this will help to elevate the ambition of students and educators."

Staff news

Arrivals

We welcome Dr Xiaohui Zhao, Senior Lecturer, Information Technology to the Mt Helen Campus.

Departures

CIAO members Dr Guillermo Pineda-Villavicencio and Dr Alireza Jolfaei left the university at the late June 2019 for Deakin University and Macquarie University respectively.

Guillermo graduated with a PhD from the University of Ballarat (supervisor Prof Mirka Miller) in 2006 and since then has been with CIAO. Alireza joined Federation University in 2016.

We particularly thank Guillermo for all his hard work resurrecting the Newsletter in 2016 and editing it from then until the previous issue.

We wish all the best to our former colleagues with their new jobs and hope that their connections with CIAO will be preserved.

Vale David Stratton

We are saddened by the passing of former CIAO member, Dr Dave Stratton who passed away on 6 June after a long illness.

David commenced as a lecturer in the School of Information Technology and Mathematical Sciences (ITMS) in 1996 and although diagnosed with multiple sclerosis the same year, he continued a full teaching load for the following 14 years. His excellence with undergrad teaching, world class research and a perennially positive attitude has left a lasting legacy with students and staff.

David was awarded the university's first Doctor of Information Technology doctorate for his research in distributed computer systems.



He actively led the Virtual Reality and Simulation Laboratory for the Centre for Informatics and Applied Optimisation and other projects.

He has been an active advocate for ensuring an all-abilities attitude to life including the TrailRider (pictured below) a one-wheeled, all terrain chair guided by a number of "sherpas" that allows non-walkers to experience off the beaten track walks, now in all Parks Victoria parks. (www.bushwalkingblog.com.au/trailrider-wheelchair-hiking/).



Although David was to receive a Distinguished Alumni Award at this year's FedUni Alumni Award Ceremony on 2 July 2019, sadly David passed away before the ceremony but his wife Ros accepted the award on his behalf.

HDR news

New PhD scholarships at the School of Science, Engineering and Information Technology

New PhD scholarships have been announced by the School of Science, Engineering and Information Technology to attract interests and enquiries from high quality prospective PhD students. Decisions about successful applicants are due to be made by the end of October, and we look to this boost to the School's and the Centre's research.

PhD examinations

CIAO PhD student **Adam Bignold** has successfully completed all the requirements of the degree of Doctor of Philosophy.

Thesis Title: Rule-Based Interactive Assisted Reinforcement Learning

Supervisor: A/Prof Peter Vamplew

CIAO PhD student **Daniel Morales Silva** received his second degree of Doctor of Philosophy at a graduation ceremony in May.

Thesis Title: Assessing healthcare providers' performance with and without risk adjustment

Supervisor: Dr Guillermo Pineda-Villavicencio

CIAO in history

20 years ago (Research Newsletter #9, July 1999)

Congratulations to

Andrew Stranieri, Philip Smith and John Yearwood on the successful completion of their PhDs.

Post Graduate News

A new PhD student Adil Bagirov has arrived. His last position was as a chief of sector at the *Joint Institute for Nuclear Research*. This is an intergovernmental research centre, which is supported by Russia, Germany, Poland, the Czech Republic, and also republics from the former Soviet Union. Adil was a representative of Azerbaijan in this joint centre. Adil is a well-known expert in the area of nonsmooth optimisation. He has published 12 papers, 6 of them in international journals. He will be engaged in the study of global and nonsmooth optimisation problems at the University of Ballarat.

15 years ago (CIAO Newsletter #6, April 2004)

CIAO-GO Software - Dr Adil Bagirov along with Dr Janos Pinter of Pinter Consulting Services, Canada have developed an optimization software solution called 'CIAO-GO', (GO meaning Global Optimization). The purpose of this optimization software is to assist in the formulation and solution of highly nonlinear models under general structural assumptions. The product is now commercially available. CIAO-GO integrates global and local scope solver modules. CIAO-GO can also be embedded under a menu-driven user interface, to assist the application development process. CIAO-GO is also available for workstations; furthermore, it can be connected to a broad variety of advanced numerical modelling environments, and to customized user applications.

Visit www.ciao-go.com.au for more information.

Professor A. M. Rubinov was elected a member of International Scientific Committee of the 'Working Group on Generalized Convexity'.

Professor A.M. Rubinov was selected to be one of the four Editor-in-Chiefs of the Pacific Optimization Journal and also to be a member of the editorial board of the international Journal of Industrial and Management Optimization and Australian Journal on Mathematical Analysis and Applications.

10 years ago (CIAO Newsletter #24, Winter 2009)

ARC Linkage Grant Success

Water Pipeline System Optimization: *"Integrating dynamic and optimization models for efficient pipeline system operations in an evolving water and energy market"* CIAO is delighted to have recently been awarded an Australian Research Council Linkage Grant, with Grampians Wimmera Mallee Water (GWM Water) and the University of Melbourne. Chief Investigators for the project are

CIAO Director Professor John Yearwood, optimization specialist and CIAO research group leader Dr Adil Bagirov, and Professor Bill Moran from the Department of Electrical and Electronic Engineering at the University of Melbourne. The Partner Investigator is GWM Water's Dr Andrew Barton. Dr Barton is Senior Water Resources Engineer in their Water Resources Division, and an Honorary Research Fellow at UB. The project will develop an integrated dynamical and optimization model for water pipeline operations and distribution systems. GWM Water's Northern Mallee and Wimmera Mallee pipelines will be used as case studies.

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